3.18 DeMoivre's Theorem & nth Roots

Name_____ Date _____ Period _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Express the complex number in trigonometric form.

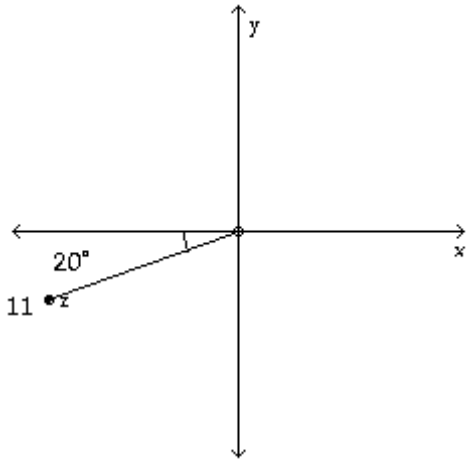
1) 3i 1) _____

2) 2 + 2i 2) _____

3) $-2 + 2\sqrt{3}i$ 3) _____

4) 3 + 2i 4) _____

5) 5) _____



Write the complex number in the form a + bi.

6) 3(cos 30° + i sin 30°) 6) _____

7) $5(\cos -60° + i \sin -60°)$ 7) _____

8) $\sqrt{2}\left(\cos \frac{\pi}{6} + i \sin \frac{\pi}{6}\right)$ 8) _____

Find the product or quotient, as indicated. Leave your answer in trigonometric form.

9) Find the product of z_1 and z_2. 9) _____

$z_1 = 7(\cos 25° + i \sin 25°)$, $z_2 = 2(\cos 130° + i \sin 130°)$

10) Find the product of z_1 and z_2. 10) _____

$z_1 = 5\left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4}\right)$, $z_2 = 3\left(\cos \frac{5\pi}{3} + i \sin \frac{5\pi}{3}\right)$

11) Find the quotient. 11) _____

$$\frac{2(\cos 30° + i \sin 30°)}{3(\cos 60° + i \sin 60°)}$$

12) Find the quotient. 12) _____

$$\frac{6(\cos 5\pi + i \sin 5\pi)}{3(\cos 2\pi + i \sin 2\pi)}$$

Find the product and quotient in two ways, a) using the trigonometric form for z1 and z2 , and b) using the standard form for z1 and z2.

13) $z1 = 3 - 2i \quad z2 = 1 + i$ 13) _____

14) $z1 = 3 + i, \quad z2 = 5 - 3i$ 14) _____

Use De Moivre's Theorem to find the indicated power of the complex number. Write your answer in standard form a + bi.

15) $(\cos \pi/4 + i \sin \pi/4)^3$ 15) _____

16) $(2(\cos 3\pi/4 + i \sin 3\pi/4))^3$ 16) _____

17) $(1 + i)^5$ 17) _____

18) $(1 - \sqrt{3}i)^3$ 18) _____

Find the indicated roots. Write the answer in trigonometric form.

19) Cube roots of $2(\cos 2\pi + i \sin 2\pi)$ 19) _____

20) Cube roots of $3\left(\cos \frac{4\pi}{3} + i \sin \frac{4\pi}{3}\right)$ 20) _____

Find the indicated roots. Write the answer in a + bi form.

21) Cube roots of $3 - 4i$ 21) _____

Find the indicated roots. Write the answer in trigonometric form.

22) Fifth roots of $(\cos \pi + i \sin \pi)$ 22) _____

23) Fifth roots of $2\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)$ 23) _____

Find the indicated roots. Write the answer in a + bi form.

24) Fifth roots of $2i$ 24) _____

Express the indicated roots of unity in standard form a + bi.

25) Cube roots of unity 25) _____

26) Sixth roots of unity 26) _____